IN THE CLAIMS

1. (Currently Amended) A dispersion compensation system comprising:

a dispersion compensation module (DCM) operable to receive optical input and provide optical output having a negative dispersion relative to the optical input; ~~and~~

a dispersion enhancement module (DEM) adapted to be optically coupled between the DCM and an optical fiber having a positive dispersion, the DEM operably including a plurality of dispersion enhancement fibers and operable to selectively increase the positive dispersion provided by the optical fiber by a selected one of a plurality of amounts and to provide the optical input to the DCM, the optical input having a positive dispersion substantially equal to the positive dispersion of the optical fiber plus the selected one of the amounts of dispersion in the DEM; and

a controller operable to determine the negative dispersion of the DCM, to determine the positive dispersion of the optical fiber, and to determine the selected one of the amounts of dispersion in the DEM to provide the optical input having a positive dispersion substantially equal to an inverse of the negative dispersion of the DCM, the controller further operable to detect a switch from the optical fiber to a backup optical transport fiber, the backup transport fiber having a third positive dispersion, and to reconfigure the dispersion enhancement module to provide fourth positive dispersion, the sum of the third positive dispersion and the fourth positive dispersion substantially equal to the magnitude of the negative dispersion.

2. (Original) The dispersion compensation system of Claim 1, wherein a magnitude of the positive dispersion of the optical input is substantially equal to a magnitude of the negative dispersion of the DCM, such that the optical output has a dispersion near to zero.

3. (Original) The dispersion compensation system of Claim 1, wherein the DCM is designed to compensate for dispersion along a fixed length of an optical fiber type, the optical fiber type having a positive dispersion per unit length; and

wherein, if the optical fiber coupled to the DEM has an actual length less than the fixed length, the selected amount of dispersion in the DEM increases dispersion by an amount substantially equal to dispersion resulting from a length of the optical fiber type equal to the difference of the fixed length and the actual length.

4. (Original) The dispersion compensation system of Claim 1, wherein the DCM is disposed between a first optical amplifier and a second optical amplifier, the first optical amplifier optically coupled to the DEM and operable to receive the optical input from the DEM, to optically amplify the optical input, and to provide the amplified optical input to the DCM.

5. (Original) The dispersion compensation system of Claim 1, wherein the DCM comprises dispersion compensation fiber having a defined negative dispersion per unit length.

6. (Previously presented) The dispersion compensation system of Claim 1, wherein each of the plurality of dispersion enhancement fibers further comprises a defined positive dispersion per unit length, each of the dispersion enhancement fibers having a different length.

7. (Previously presented) The dispersion compensation system of Claim 1, wherein the DEM is operable to selectively couple one or more of the dispersion enhancement fibers together to form an optical path coupling the optical fiber to the DCM through the selected one or more of the dispersion enhancement fibers.

8. (Canceled)

9. (Currently Amended) A method for dispersion compensation comprising:

providing an optical transport fiber coupling a first network element and a second network element, the transport fiber having a first positive dispersion;

providing a dispersion enhancement module disposed between the transport fiber and the second network element;

determining a negative dispersion of the second network element; ~~and~~

configuring the dispersion enhancement module to provide second positive dispersion, the sum of the first positive dispersion and the second positive dispersion substantially equal to the magnitude of the negative dispersion, whereby configuring the dispersion enhancement module comprises routing optical signals from the transport fiber though one or more dispersion enhancement ~~fibers.~~ fibers;

detecting a switch from the transport fiber to a backup optical transport fiber, the backup transport fiber having a third positive dispersion; and

reconfiguring the dispersion enhancement module to provide fourth positive dispersion, the sum of the third positive dispersion and the fourth positive dispersion substantially equal to the magnitude of the negative dispersion.

10. (Canceled)

11. (Original) The method Claim 9, wherein the negative dispersion in the second network element results from dispersion compensation fiber having a defined negative dispersion per unit length.

12. (Canceled)

13. (Currently Amended) A dispersion compensation system comprising:

a first optical amplifier;

a second optical amplifier;

a dispersion compensation fiber optically coupled between the first optical amplifier and the second optical amplifier, the dispersion compensation fiber operable to receive optical input from the first optical amplifier and provide optical output to the second optical amplifier, the optical output having a negative dispersion relative to the optical input; and

a dispersion enhancement module (DEM) adapted to be optically coupled between the first optical amplifier and an optical fiber having a positive dispersion, the DEM operably including a plurality of dispersion enhancement fibers and operable to selectively increase the positive dispersion provided by the optical fiber by a selected one of a plurality of amounts and to provide the optical input to the first optical amplifier, the optical input having a positive dispersion substantially equal to the positive dispersion of the optical fiber plus the selected one of the amounts of dispersion in the DEM; and

a controller operable to determine the negative dispersion of the dispersion compensation fiber, to determine the positive dispersion of the optical fiber, and to determine the selected one of the amounts of dispersion in the DEM to provide the optical input having a positive dispersion substantially equal to the positive dispersion of the optical fiber plus the selected one of the amounts of dispersion in the DEM, the controller further operable to detect a switch from the optical fiber to a backup optical transport fiber, the backup transport fiber having a third positive dispersion, and to reconfigure the dispersion enhancement module to provide fourth positive dispersion, the sum of the third positive dispersion and the fourth positive dispersion substantially equal to the magnitude of the negative dispersion.

14. (Previously presented) The dispersion compensation system of Claim 13, wherein each of the plurality of dispersion enhancement fibers further comprises a defined positive dispersion per unit length, each of the dispersion enhancement fibers having a different length.

15. (Previously presented) The dispersion compensation system of Claim 13, wherein the DEM is operable to selectively couple one or more of the dispersion enhancement fibers together to form an optical path coupling the optical fiber to the DCM through the selected one or more of the dispersion enhancement fibers.

16. (Currently Amended) A dispersion enhancement module adapted to be optically coupled to a dispersion compensation module having a fixed negative dispersion, the dispersion enhancement module comprising:

an optical input adapted to couple to an optical transport fiber;

an optical output adapted to couple to the dispersion compensation module;

a plurality of dispersion enhancement fibers; ~~and~~

a plurality of optical switches coupling the optical input and the dispersion enhancement fibers, the optical switches operable to form an optical path between the optical input and the optical output, the optical path passing through one or more of the dispersion enhancement fibers, wherein optical signals from the optical output have a positive dispersion substantially equal to a sum of positive dispersion of the transport fiber and positive dispersion of the optical path; and

a controller operable to determine a negative dispersion of the dispersion compensation module, to determine the positive dispersion of the transport fiber, to determine the optical path, and to configure the optical switches to establish the optical path, the controller further operable to detect a switch from the transport fiber to a backup optical transport fiber, to determine a second optical path between the optical input and the optical output, the second optical path passing through one or more of the dispersion enhancement fibers, and to reconfigure the optical switches to establish the second optical path.

17. (Original) The dispersion enhancement module of Claim 16, wherein a magnitude of the positive dispersion of the optical signals is substantially equal to a magnitude of the negative dispersion of the dispersion compensation module.

18. (Original) The dispersion enhancement module of Claim 16, further comprising a controller operable to:

detect a switch from the optical transport fiber to a backup optical transport fiber;

determine a difference in magnitudes of the negative dispersion of the dispersion compensation module and a positive dispersion of the backup optical transport fiber; and

reconfigure the optical switches such that the optical path has a positive dispersion equal to the difference in the magnitudes.

19. (Original) The dispersion enhancement module of Claim 16, further comprising a controller operable to:

determine the negative dispersion of the dispersion compensation module;

determine the positive dispersion of the optical transport fiber; and

configure the switches such that a magnitude of the positive dispersion of the optical signals from the optical output is substantially equal to a magnitude of the negative dispersion of the dispersion compensation module.

20. (Original) The dispersion enhancement module of Claim 16, wherein the switches are further operable to optically couple the optical input and the optical output such that the optical path bypasses the dispersion enhancement fibers.